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ABSTRACT

Offered is an explanation for the development of early infantile autism as defined by L. Kanner which incorporates the behavior of the child, the behavior of the parent, and a critical time period of development. Writings of Kanner on the characteristics of autistic children, parental characteristics, and etiology are reviewed. The formula suggested includes three necessary and interacting components: (1) a child who is unable, due to physical limitations, to benefit from usual amounts of maternal stimulation and/or who is deficient in proximity-producing or sustaining behaviors; (2) caretakers who tend to minimize contact with the child and (3) an insufficient amount of interpersonal contact during the first year of life. The formula is supported through a review of research on early experiences and infra-human development and attachment and identification in children. Identified as secondary (acquired by associative learning principles) characteristics of autistic children are excellent rote memories and echolalia. (DB)

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A FORMULA FOR EARLY INFANTILE AUTISM

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A formula for the development of Early Infantile Autism (EIA) is presented. This formula incorporates three necessary and interacting components: (1) behavior of the child; (2) behavior of the parent; and (3) reduced parent-child interactions during the first year of life. The resulting lack of identification with humans is viewed as the primary deficiency in EIA and one that facilitates the learning of many secondary characteristics. The current analysis is consistent with the writings of Leo Kanner and is supported by extensive human and infra-human research in the area of early experiences. The formula's components are compatible with both biogenic and psychogenic theories of autism that have been previously suggested.

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A FORMULA FOR EARLY INFANTILE AUTISM[1]

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In 1943 Leo Kanner presented the behavioral characteristics and histories of a small group of disturbed children who did not fit into the Kraepelinian classification system existing at that time. He proposed the name "Early Infantile Autism" (EIA) to describe this new and infrequently found syndrome. The two primary characteristics which differentiated the EIA child from others were a profound self-isolation from people and an obsessive desire for the preservation of sameness. Unlike childhood schizophrenia which was said to follow a normal period of development, EIA children were said to be different from the very beginning of life. In addition, Kanner reported that with few exceptions, the parents of these EIA children formed a strikingly homogeneous group in terms of personality and behavioral characteristics, educational level, and socio-economic status.

In the last three decades, autistic children have been written about by a number of individuals with varied interests and backgrounds, and without a doubt this literature has greatly influenced the thinking of many readers of this paper. Unfortunately, "...now the term infantile autism is rather widely--and often not too accurately--employed [Kanner and Eisenberg, 1965; p. 558]." Later when discussing misdiagnosis, Kanner re-emphasized that it has become "...a habit to debate the original concept of infantile autism by diagnosing it in many disparate conditions which show one or another isolated symptom(s) found as a part feature of the overall syndrome [1965, p. 413]." To avoid referencing articles which may be based on children with such errors in diagnosis, the following article will deal with the characteristics of the EIA child and its parents based only on those descriptions furnished in articles authored or co-authored by Kanner himself. This is a very important clarification. The narrowness of referencing does not in any way imply that other articles are irrelevant or incorrect. It only means that one cannot always determine the status of the children referred to in these other articles; thus, it is best to use none of them and avoid errors completely than to use some and unintentionally err in any of the cases. The limited referencing is especially important when authors report child or parental characteristics not included by Kanner or when they refute those characteristics that were included by him. Since many of the readers of this article may have been exposed primarily to information and interpretations of autism different from Kanner's, it is best to review the major characteristics of Early Infantile Autism as presented by Kanner himself from 1943 through 1973.

Children's Characteristics

From 1943 to 1954, Kanner reported 100 cases of children which he believed to demonstrate clearly the Early Infantile Autism syndrome. Of these cases, 80 were males and 58 were first or only births.

Kanner (1954) states that "...the developmental history and the two pathogenic features of aloneness and insistence on sameness are always present and indispensible for the inclusion of any child in the category of early infantile autism [p. 379]." The developmental history referred to is that of an unusually apathetic youngster who appears to be self-isolated from people from the very beginning of life and not after a period of normal development. The parents regularly report they sensed something was atypical within the first year of life. Among the behavioral characteristics often included are: A) a sparsity of responses to visual and/or auditory stimulation with a common suspicion of deafness; B) "contentment" at being left alone for long periods of time; C) no anticipatory movements prior to being picked up; D) very poor or non-existent bodily adjustments while being held; E) a decrease in the range and extent of spontaneous activities; and F) frequent feeding problems. Underlying this development is an extreme emotional isolation from people which Kanner states is in fact the primary characteristic of Early Infantile Autism. Due to the retardation in interpersonal relationships and activities, the EIA child is commonly believed to be feeble-minded, in spite of its lack of physical anomalies and the absence of known organic malfunctions or metabolic deficiencies. However, subsequent testing has shown good overall cognitive capabilities in spite of some idiot savant tendencies.

Behavioral characteristics which are more noticeable after the first year center around the child's skillful and affectionate interaction toward objects compared to a neutrality toward people. For example, "when a hand was held out before him so that he could not possibly ignore it, he played with it briefly as if it were a detached object [Kanner, 1943; p. 224]." Also, there is a very strong interest (obsession) in maintaining an environmental sameness. Frequently, such minor changes as moving objects on shelves or rearranging furniture can lead to excessive fear and tantrum-like behaviors on the part of the child. Repetitive and stereotyped behaviors abound, e.g., spinning or manipulating objects or following routines with absolutely no variation. Vocalizations also tend to be repetitive and at times unrelated to external activities. Common secondary or accessory characteristics of EIA include communication difficulties and phenomenal rote memories for both places and things. Among the non-mute EIA children, language is often of an atypical nature that includes echolalia and pronominal reversals. Gross and fine motor coordination is commonly judged to be average or above. "...There are, from the beginning, differences in the intensity of autistic aloneness and fragmentation [Kanner and Eisenberg, 1955; p. 232-233]" and errors in diagnosis may occur.

In spite of extensive and varied therapeutic attempts, the prognosis for the EIA child is extremely poor. In 1955, Kanner and Eisenberg reported that of 42 EIA children with a mean age of 14 years (range 8 - 24 years), only one had shown any real recovery to normality during therapy. The twelve who did show sufficient improvement to live at home and function in the community on a limited basis had schizoid tendencies, disturbed interpersonal relationships, and a "tenuous contact with reality." As adolescents they had retained the primary characteristics of Early Infantile Autism but had lost many of the secondary characteristics. In his 1971 report on the eleven children originally presented and evaluated in 1943, Kanner cites two cases which have shown near normal adjustment and another with marginal adjustment who was living in a sheltered environment. The two "real successes" (age 34 and age 36) were single, living at home, holding non-demanding jobs, and engaging in some community activities. However, in one case (and possibly in the other, although the report contained insufficient detail), the individual still exhibited a lack of initiative, engaged in little social conversation, and was not interested in the opposite sex. His mother reported that he "...is not completely normal, (but) he has taken his place in society very well... [Kanner, 1971; p. 112]."

Parental Characteristics

In the initial paper in 1943, Kanner wrote of an additional homogeneity found in the EIA children--parental characteristics. Generally, not only were the parents from the upper socio-economic level, highly intelligent and educated, but they were also behaviorally very similar. Such descriptions as "sophisticated," "impersonal," "absence of whole-hearted interest in people," "maternal lack of genuine warmth," "undemonstrative," "preoccupied," and "mechanization of human relationships" have been used to characterize the parents. It should be noted that Kanner repeatedly (1944, 1949, 1954, 1956, and 1965) included these as common characteristics of parents when discussing Early Infantile Autism and gave the impression that a diagnosis of Early Infantile Autism was infrequently made on a child whose parents did not exhibit these tendencies and/or traits. Fully 90% (Kanner and Eisenberg, 1956) to 100% (Kanner, 1954) of the cases had parents who met these characteristics. Most children were not unwanted babies, and the parents generally attempted to provide sufficient and proper care. However, exceptions do occur. One mother is reported as trying to raise a perfect baby by leaving her alone and giving "...her no more attention than was deemed necessary for obsessively regulated feeding and change of diapers [Kanner, 1949; p. 424]," while an ornithologist states "I felt it was my duty to have a child, and we planned to have him. I am not very attached to children...I am more interested in my birds than I am in people [Kanner, 1949; p. 425]." Interestingly, Kanner (1949) reports that many families have come to him with detailed behavioral case histories of their child's development.

Etiology

Originally, Kanner (1943) assumed that "...these children have come into the world with an innate inability to form the usual, biologically provided effective contact with people... [p. 250]." But later, when emphasizing the environmental effects, he spoke of a "...familial trend toward detached, obsessive mechanical living [Kanner, 1954, p. 385]" conveyed by the parents. Writing with Eisenberg in 1956, Kanner again referred to the family constellation and interactions as being important, yet plainly stated that this factor alone was insufficient to generate an EIA child. Clearly, Kanner had discussed and re-emphasized over a considerable time span the dual factors of the child's condition at birth interacting with a characteristic family configuration to produce an EIA child. Unfortunately, such an interaction was never analyzed in any detail.

Currently, there is no one theory which commands general acceptance in accounting for the EIA child's developmental behavior patterns and preferences. This is not to say that the etiological factors have been ignored, for many explanations ranging from the biogenic to the psychogenic have been proposed. However, in spite of the prolific interest, research, and writing in this area, Kanner (1972) still does not offer an etiology for Early Infantile Autism in the most recent edition of his text on child psychiatry.

Reflections

Three comments warrant presentation in order to emphasize the author's position and provide a rationale for later arguments.

(1) Initially, it is somewhat intriguing how steadfastly Kanner has believed that EIA children are different at birth and may bring this "innate inability" to form human relationships with them. To date, this writer is unaware of any literature reporting the human infant's innate ability to form affective relations with other humans. With the exclusion of EIA children, it may be quite easy to deduce this from the fact that infrequently, if ever, does one encounter a human who fails to relate to other humans. However, this common characteristic of humans to relate/orient to one another does not make it innate. It may be acquired.

(2) To this writer, Kanner's consistency over a 30-year span to include both child and parental factors as probable contributors suggests the importance and necessity of incorporating both of these parameters in a model of EIA symptomology that would be compatible with his description of the syndrome and its characteristics. In contrast, it seems as if there is a tendency for theories to emphasize either a biogenic or psychogenic rationale, thus being unable to readily account for all of Kanner's observations.

(3) Another interest centers on the primary characteristic of these children that is mentioned regularly, but one which may not always be viewed in the proper perspective. The writer refers to the child's non-existent/impaired affective relationships with people which describes their orientation not only as children, but also as adolescents and adults (Kanner, 1932, 1933, 1965; Kanner and Eisenberg, 1955). The use of such terms as "withdrawal" and "self-isolation" may be misleading for they suggest that social orientations toward other humans are consciously or unconsciously held back by the child itself. Such terminology accomplishes one of two things. It can imply that the orientation to relate to people is present but that the child attempts to circumvent and even dissolve it, or it may mean that such an orientation should be there automatically and that the child "knows" this, but then attempts to prevent it from occurring. This writer's contention is that there is no relationship from which to "withdraw" or "isolate" oneself. The lack of human identification is in fact the problem and most other behavioral tendencies, including any secondary characteristics, evolve as a result of it.

A Formula for Early Infantile Autism

Given this brief review of Early Infantile Autism and its characteristics, a formula for its occurrence will be presented which is compatible both with Kanner's extensive descriptions and with the available literature on attachment and identification in both humans and infra-humans. The term "formula" is used due to its explanatory nature; it implies that a number of substances must be put together in a particular order during a particular time state in order to generate the end product. Additionally, a formula implies that all components are necessary and that the product is not caused by a single component.

The EIA formula has three necessary and interacting components: (A) a child that is unable, due to physical limitations, to benefit from a sufficient amount of maternal stimulation and/or who is deficient in proximity-producing and proximity-sustaining behaviors; (B) caretakers who tend to minimize contact with the child and/or whose contact promoting and sustaining behaviors tend to extinguish due to insufficient reinforcement from the child or each other; and (C) an insufficient degree of interpersonal contact activities between child and caretakers during the first year of life. The simultaneous occurrence of all three necessary components is not likely, and this accounts for the relative rarity of the true EIA syndrome.

If all components are present, then a child will result who is deficient in basic social orientations toward humans and who exhibits deficiencies in behaviors which are enhanced by such an orientation. The lack of human identification is the basic tenet of this paper. The EIA child does not identify with humans and does not benefit from many childhood contacts with them because it does not know it is a "person" in the usual sense; i.e., it

has never formed a primary social orientation toward people. Parents and therapists know it is a person, expect it to behave accordingly, and all too often assume it will benefit from interpersonal interactions as readily and normally as do other children. However, it does not. This child may eventually learn to react to humans in a somewhat detached, indifferent manner, but in few cases (if ever) does it truly relate to people in a manner which is typical for other non-EIA children.

This formula does not imply that all EIA children and their parents must behave exactly the same way during the child's initial year. However, it does strongly suggest that the disorder will not develop into Kanner's EIA syndrome if the child and parent(s) deviate considerably from the behavioral characteristics described by him. There is sufficient literature available to warrant such a theoretical position for Early Infantile Autism and the following analysis may help to explain the profound and intriguing characteristics of this syndrome, its general unsusceptibility to therapy, and its rarity.

Early Experiences and Infra-Human Development

Since the early work by Konrad Lorenz with precocial birds, the concept of a species orientation and its relation to critical and/or sensitive periods has been used to help explain the basis of both behavioral tendencies and specific behaviors in infra-humans (Hess, 1959; Hoffman and Ratner, 1973; Sluckin, 1972; Thorpe, 1963). These behavioral tendencies have encompassed the organism's identification with members of its species (or lack or orientation toward nonspecies members) and the type and degree of social behaviors emitted in their presence. Some adolescent and adult behaviors in both birds and mammals appear to be a function of certain inter-organismic experiences which have their influence at a particular period early in life rather than later.

Organisms not exposed to certain types of contact experiences of sufficient duration have not usually been able to benefit readily and fully from similar experiences after the particular period for their influence has passed.

Scott (1963, 1972), who is particularly concerned with social behaviors, differentiates between primary and secondary socialization. Primary socialization, which is equivalent to Hess' (1964) social or filial imprinting, pertains to the acquisition of a basic bond or orientation toward members of the organism's species during a critical period of development; secondary social attachments, which can occur throughout life, pertain to the formation of specific relationships with one or a few organisms, regardless of the species. As an example of primary socialization, the critical period in puppies occurs between 3 and 10 weeks of age and particular behaviors which are emitted by the puppy serve to regulate the onset and termination of this

period (Fox, 1965; Scott, 1962). These behaviors either bring the puppy into contact or maintain contact once initiated (curiosity, playful behaviors, tail wagging, etc.) or prevent and/or minimize contact once it has occurred (biting, fear, cowering, running away, etc.). Scott (1962, 1968) stresses the importance of interorganismic experiences during this critical period, rather than the mere occurrence of the period, in order to insure the socialization of the puppy. The extent and complexity of the contact is more important than the type, because punishing/painful interactions do not decrease socialization nor do rewarding interactions necessarily enhance it. Dogs and wolves exposed to humans for the first time after the end of their primary socialization period are never as friendly and tameable as those subjects who do receive some human contact during this period (Freedman, Elliort, and King, 1961; Scott, 1962 and 1972). Thompson and Heron (1954) report that restricting social activities in dogs for the first eight months of life causes the development of atypical social behaviors and emotionality. Dogs raised in visual isolation from humans and other dogs from 3 weeks to 10 months of age show stereotyped behavior patterns, inappropriate social behaviors, and a failure to respond normally to auditory stimulation (Melzack, 1965). Fox (1968) adds that socially isolating dogs up to 4 - 8 months can lead to irrational fears of novel objects, difficulties in adjusting to changes in daily routines, and a tendency to engage in self-play or to explore inanimate objects.

Scott (1972) suggests that secondary social relationships may occur outside of the critical period, but these relationships and associated behaviors will develop more slowly and the range and extent of secondary social behaviors will be limited, especially if primary social bonds are absent.

In support of a differentiation between primary and secondary socialization, Hess (1964) states:

> In the case of social imprinting, taming is the associative learning counterpart; thus an animal may be tamed by human beings even though the primary socialization or imprinting to members of its own species has taken place. But the social bond created by taming is not the same as the bond formed by imprinting for a tamed animal will court and attempt to mate with opposite sex members of its own species but not with human beings (p. 1138).

It seems that an organism may learn to emit a group of social behaviors, and in fact may even acquire a close attachment to another species member, without having a primary social orientation toward that species in general. In other words, the formation of primary social bonds between a young organism and its species members is not a necessary prerequisite for the learning of some social behaviors or specific attachments later on, nor does the acquisition of social behaviors later in life imply that social bonds are being formed concurrently.

In addition to the canine and avian research on critical/sensitive periods, the influence of early rearing experiences on primate development has been systematically investigated. Typical procedures raise infant monkeys and chimpanzees in varied degrees of stimulus isolation and contact deprivation from humans, mothers, and/or peers. In general, it is not intellectual activities but sexual behaviors and responsiveness to social and environmental stimuli which are impaired (Harlow and Harlow, 1962; Harlow and McKinney, 1971; Harlow, Plubell, and Baysinger, 1973; Mason, 1960; Mitchell, 1968). The degree of disruption is a function of the age of the organism as well as the extent and duration of the deprivation. Monkeys raised in isolation from birth through 6 or 12 months exhibit both short and long term disturbances in social behaviors while those removed after 3 months recover considerably (Mitchell, Raymond, Ruppenthal, and Harlow, 1966; Sackett, 1968).

A range of behavior deficits result from early contact deprivation experiences. These include: (1) a strong dependence upon the familiar and atypical fear of novel situations and routines (Harlow, 1964; Mason, 1968; Menzel, Davenport, and Rogers, 1972; Sackett, 1967); (2) an increase in stereotyped and ritualistic behaviors which are magnified by periods of high arousal (Berkson, 1968; Davenport and Menzel, 1963; Mitchell, 1970); (3) a preference for manual exploration and stimuli of reduced complexity (Baysinger, Brant, and Mitchell, 1972; Sackett, 1965); (4) disruptions in the normal development of communicative skills (Brandt, Stevens, and Mitchell, 1971; Mason, 1960; Menzel, Davenport, and Rogers, 1963; Mitchell, 1968; Randolf and Mason, 1969); and (5) a tendency to show response perseveration during learning tasks (Gluck, 1974; Sackett, 1970). Furthermore, Menzel (1968) reports:

> From laboratory research we know very clearly...that the entire basis of group life can be almost wiped out by raising individuals through infancy without social experience. To this extent, not only the form of group organization but group life as such is completely dependent upon the early environment of individual animals (p. 178).

For some time, the effects of deprived early experiences have been viewed as basically irreversible. However, recent studies with monkeys by Harlow and Soumi (1971), Soumi and Harlow (1972), and Gomber and Mitchell (1974) suggest this may not be totally correct for social competence if particular "therapeutic" strategies are employed. This work seems most promising, but it is not clear if both social behaviors and primary social bonds are being established or only the former.

Discussing critical/sensitive periods, primary and secondary socialization, and imprinting may be irrelevant if these concepts have no bearing

on human functioning. Unfortunately, there is no definitive evidence available to offer in support of the relevance of these concepts to human developmental processes. However, current lack of support does not mean a relationship will not be found. A number of individuals have used the concept of critical periods when discussing human behavior (including Moore and Shiek, 1971, with autistic children), and the role of early experience has been viewed as an important precursor in cognitive, language, and personality development.[3] Finally, terms such as "human relatedness" (Reichter and Schopter, 1971) and "filiative behaviors" (Caldwell, 1962) have been used when discussing the infant's social relationships with other humans. In conjunction with these interests and the degree of supportive infra-human literature, this writer believes that the concepts of critical/sensitive periods, imprinting, and primary socialization do pertain to human functioning in principle, even though at this time their importance and relevance is neither fully understood nor appreciated.

Attachment and Identification in Children

It is now pertinent to evaluate the course of normal child development in the areas of early experiences, social behaviors, and infant-mother interactions to determine parallels, if any, which exist between normal human development and the reported findings using infra-humans.

Recent literature has dealt with the role of mother-child attachments and attachment behaviors in early human social development. Both Bowlby (1958, 1969) and Ainsworth (1967, 1969) suggest that the child has a definite and normal role in the development of an attachment to its mother by emitting a group of behaviors which serve to encourage, initiate, and maintain contact with her. The behaviors usually referred to include sucking, smiling, cooing, clinging, crying, preparatory responses prior to being picked up, babbling, and following first visually but later by means of crawling or walking. Many of these behaviors are mediated by the distal senses and in addition to their role in contact situations (Walters and Parke, 1965), they serve to provide a desirable object with which the caretaker may interact. Given the spontaneous presence of these behaviors, their frequency of emission can be increased or decreased by the changes they create (or fail to create) in the environment (Bell and Ainsworth, 1972; Gewitz, 1961; Greenman, 1963; Lewis and Goldberg, 1969; Papousek and Berstein, 1969; Watson, 1973). These consequences of the child's behavior are either actual changes in the behavior of the caretaker (usually the mother, but in reality any one who cares for the child) toward the child or they are environmental changes mediated by the caretaker.

In addition to the child's behaviors which normally serve to increase the amount of contact with the mother and thus facilitate the development of an attachment, another important variable in this dyad is the mother herself. Irrespective of the type and frequency of the child's behaviors, the

mother's personality characteristics and behavioral tendencies are evident while caring for her infant (Bell and Ainsworth, 1972; Murphy, 1973; Osofsky and Danzger, 1974). Stern, Caldwell, Hersher, Lipton, and Richmond (1969) report that mothers differ in their degree of infantile stimulation (tactual contact, vocal contact, initiating activities, etc.) and discuss a continuum which ranges from "mother-centered" to "child-centered" maternal functioning. A child-oriented mother adjusts her routine around the needs and behaviors of the child, while a mother-centered interaction de-emphasizes contacts based on infant-initiated behaviors. Just as the mother's behavior can and does influence the extent of contact they have together, the reverse is true; the type and frequency of maternal behaviors are influenced by their consequences--that is, the child's responsiveness (Beckwith, 1971; Bell, 1971; Moss, 1967; Yarrow, 1972). Usually the responsiveness of the child is the most important external reinforcement for the mother's behavior, but it is apparent that the type of spouse reaction to maternal behaviors could also influence their type and frequency.

What normally evolves then is a characteristic and stable mother-child type of interaction and resulting attachment which is a function of the child's behaviors, the mother's behaviors, and most importantly the reciprocal interaction of these two behavioral patterns (Maccoby and Master, 1970; Yarrow, Rubenstein, and Pederson, 1972).

Bowlby (1969) states that his use of the term "attachment" pertains to the social relationship between the child and its mother and not to an identification to the human race, per se. In view of the infra-human research, it is difficult to imagine how a maternal-child attachment would not play a crucial role in the development of the child's general orientation toward humans, if human identification is acquired rather than being innate. In fact, the development of a strong attachment between the child and its mother may serve a dual function: (A) directly, that of contributing to the regular presence of a life sustaining caretaker, and (B) indirectly, yet just as important, that of promoting the presence of a stimulus object with which the child can form primary species-specific social bonds so necessary to its future interpersonal development.

The importance of early life contact experiences with humans and thus the opportunity to form strong attachments has been extensively investigated in those situations which seem to minimize such contact; namely, the institutional settings. It appears that social responsiveness and language development are among those areas primarily influenced by such early rearing experiences (Ainsworth (1962); Dennis (1960); Provence and Lipton, 1962; Yarrow, 1961). Mussen, Conger, and Kagan (1969) state:

> ...lack of consistent interaction with a caretaker--which is one of the major deficits in an institutional setting--leads to depressed and abnormal social behavior and retarded language development...Responses that are acquired

> through and involved in social interaction, such as language and social responsiveness, appear to be most vulnerable to deprivation experiences (p. 235).

In contrast, memory and drawing performances, motor skills, object manipulation, and postural development are least likely to be affected by caretaker deprivation. Langmeier (1972) reports that low stimulation levels and the lack of a specific attachment person, both of which are characteristic of institutions, lead in some cases to emotional apathy, general hypoactivity, superficial and shortlasting social relationships, increases in exploratory and manipulative activity, and "exorbitant fear reactions" to new situations. Furthermore:

> Socially hypoactive children are usually indifferent in their relations to adults and tend to repudiate other children...They are quiet and contented unless somebody disturbs them, takes their toys, or makes other claims upon them. Not infrequently, the nurses say that these children 'look through them'...a certain equilibrium takes place in the adult-child interaction... the hypoactive ones continue to receive more material and fewer social stimuli, and their social passivity further increases (Langmeier, 1972, p. 340-341).

Both Goldfarb (1944, 1945) and Langmeier (1972) report that undesirable traits acquired as a result of institutionalization even persist into adolescence in spite of appropriate foster home placements.

It appears then that an early mother-child interaction and the resulting attachment is extremely important for subsequent development, yet it is unclear as to how early such attachments must be formed in order to negate undesirable behavioral consequences.

Though conclusive supportive studies are lacking, it may not be premature to state that if sufficient contact with a caretaker is not provided during the first year (which could contain the critical/sensitive period for the development of a primary social orientation), then deficiencies will begin to occur and thus set the stage for subsequent developmental impairment. It is important to note that these contacts seem to necessitate at least a minimum level of stimulation, especially tactual.

Relating the EIA Formula

Given the EIA formula and support from the human and infra-human research showing striking behavioral and attitudinal parallels to EIA children, it is now appropriate to evaluate the formula's compatibility with the information presented by Kanner (1943, 1944, 1949, 1951, 1954, 1956, 1965, 1973).

The Child

It is necessary to have a child who is behaviorly different from birth on, or soon thereafter, in order to minimize the opportunity for it to sufficiently interact with its caretaker. The child may be characterized in one of two ways, which themselves may not be mutually independent characteristics.

(1) The EIA child may suffer from a deficiency to fully benefit from parental contact situations once they are ongoing. This is suggested by the children's general unresponsiveness to visual and auditory stimulation and the repeated suspicion of deafness. In addition, though not specifically reported by the parents in Kanner's group, the children could exhibit decreased responsiveness to other cues; e.g., tactual and olfactory stimulation. If the child does not react normally to stimulation, which signals an awareness of the caretaker and later a sign of attachment to it, then the child may not be benefiting from interpersonal contact which can only be channeled through the various sense modalities. This does not imply that the child consciously or unconsciously rejects its mother or its environment (a deaf child does not "reject" auditory stimulation). It merely suggests that in spite of interpersonal contact which for the the normal child would suffice, stimulation for this child may not be fully registered, and thus not have its normal effect.

In spite of the interest in EIA the past three decades, neither Kanner nor others have reported any major biochemical and/or physiological deficiencies regularly found in EIA children which could account for their lack of environmental responsiveness. This lack of understanding may mean that we have not yet discovered the common deficiency in these children, or that, regardless of our efforts, the one characteristic deficit is unlikely to be found because there is no single one. It may be that, unlike PKU or Down's Syndrome, the somewhat uniform postnatal behaviors in EIA are influenced by different causes in different cases; causes which by themselves may not be independent of environmental influences. This is supported by White (1974) who states that "the apparently contradictory findings on the nature of physiological response in the autistic child may derive from the fact that similar clinical syndromes... may stem from quite different levels of brain damage and/or autonomic response [p. 250-251]." A number of areas are being investigated which would satisfy this aspect of the formula's first component and the reader is referred to DesLauriers and Carlson (1969), Hingten and Bryson (1972), Newsom and Lovaas (1973), Rimland (1964), Rutter and Bartak (1971, Schwartz (1973), The Journal of Autism and Childhood Schizophrenia, and others for a thorough investigation of the physical/biochemical/perceptual anomalies associated with autism in general.

(2) Compounding any deficiency in sensory processing (though not necessarily resulting from it), the child may behave in a manner in which there are fewer than necessary proximity-producing or proximity-sustaining behaviors. Such a behavioral repertoire would tend to inhibit contact with parents from occurring and/or to terminate it once it has begun. In fact, it seems that the EIA child

does have such a behavioral history. Kanner (1943, 1944) describes them as: (1) showing no anticipatory movements prior to being picked up; (2) not orienting or adjusting to the caretaker while being held; (3) content to remain alone for long time periods; (4) quiet and withdrawn; (5) frequently exhibiting some type of feeding problem; (6) lack of affection shown during contact with caretakers; (7) a lack of responsiveness to distal stimulation; and (8) exhibiting an "impenetrable aloneness." If a summary statement were to be made, one would characterize the child's post-natal behavior as tending to inhibit and minimize interpersonal contact if and when it occurs. This is not to say that these children withdraw these early post-natal behaviors or intentionally do not emit them; it appears to this writer that the behaviors merely do not occur spontaneously or are not emitted in response to, or elicited by, external stimulation.

A question which commonly arises centers around the parent's acceptance of this type of child without turning to professional assistance until the child is older; i.e., "if the child is so different, why isn't something done about it right away?" One must remember that of the 100 cases reported by Kanner through 1954, 58 were first or only borns and 23 were second births. It would be quite likely, due to a lack of experience with different types of babies and with the 'help' of a family doctor/friend saying that "the child will grow out of it," that the parents would not be overly concerned with the lack of responsiveness and could, in fact, believe that their parental behaviors and the child were quite normal due to the "contentment" exhibited by their child.

The Parent

The formula requires a caretaker who tends to spend an insufficient amount of time in contact (most importantly tactual but also visual-verbal) with the child. This situation may result from the behavioral tendencies of the parents, the lack of demand on the part of the child, and/or unrewarding interactions with the child.

Kanner (1943, 1944, 1949, 1954, 1956) does report several parental characteristics which suggest an overall tendency that would minimize stimulation and lead to reduced interpersonal contacts with the child. The parents are portrayed as: (1) preoccupied with their own interests; (2) satisfied to let the child remain alone; (3) cold and unemotional; (4) having mechanical-type interpersonal relations; and (5) showing a lack of genuine warmth. A general description might be very "parent-centered." The report of numerous detailed case histories provided by the parents (Kanner, 1949) also suggests that many of these parents may have preferred to monitor their child's development rather than to become actively involved in it.

Given these parental characteristics, it is evident that any pro-social, attachment promoting behaviors that the child might emit could tend, albeit unintentionally, to be extinguished or at least reduced in frequency by a

low level of parental responsiveness. Additionally, given the characteristics of the EIA child, it is easy to understand how attachment promoting caretaker behaviors, even if they are emitted less frequently and more mechanically than normal, would tend to reduce in frequency due to the child's lack of reinforcing responsiveness. One could also speculate that behavior of a 'parent-centered' caretaker would begin to extinguish more readily than a 'child-centered'caretaker. As previously stated, a spouse who is not present or who is uninterested, may also unintentionally decrease the frequency of the caretaker's pro-social behaviors by not providing the needed encouragement/reinforcement.

No doubt, given the interests and characteristics of the parents, any reduced parent-child contacts would not be totally undesirable to the parents since the time saved could then be spent on other activities and interests. This in itself could serve as an incentive to leave the child alone if it is "content."

It should be re-emphasized that the mother-child dyad or the mother-father-child triad is a function of interacting behavioral repertories; they are reciprocal and thus may be either self-perpetuating or self-limiting. In the current analysis, the negative consequence of each participant's behavior is interpreted as being magnified and tending to be self-limiting.

At most, about 10% of the parents do not share the characteristics of the majority (Kanner and Eisenberg, 1956), but it is unclear in what way and degree they are different. This does not, however, negate the parental component of the formula. Aside from an error in diagnosis (which Kanner does admit to, 1968), three explanations can be offered. Initially, such an EIA child may have been so severely deficient in its ability to benefit from any contact situations, that even with near sufficient interactions no primary bonds were formed. Also, the mother, in spite of her tendencies for interaction, may not continue to encourage and sustain contact situations if insufficient reinforcement for her is provided and if the child appeared very "contented." Such reduced contact probably would not be welcomed by the mother, but could still be accepted and permitted if the child "liked it" that way. Finally, it may be that the actual father-mother-child triad style of interaction in the home was not truly reflected in the individual behavioral and personality tendencies of each outside of the home. Thus, individual parents may not have appeared as 'detached' and 'impersonal' toward the interviewer, but did generate such an environment when in interaction in the home.

The resulting parent-child style of interaction which minimizes contact during the first year is not completely void of contact because hunger, thirst, and personal hygiene must be attended to. However, these contacts seem to be insufficient in duration to promote the formation of basic social bonds on the part of the EIA child. From what is known about the effects of institutionalization on normal development, the mere presence of an adult periodically is not always sufficient to overcome the negative consequences of early institutionalization. Similarly, the post-natal exposure to human contact during maintenance may also be insufficient for EIA children.

The reader might assume that this current formula for EIA emphasizes the role of the parents. This is incorrect. Since institutionalized children who have reduced contact with humans during the first year are not regularly void in primary social orientations toward humans, and since EIA children do have normal siblings, one can only conclude that the parents do have a relevant role in the development of EIA, yet they by themselves could not generate the EIA child. The current interpretation is that particular parental behaviors are concommitant with particular offspring behavioral deficiencies of physiological origin; i.e., there are both biogenic and psychogenic factors in the development of this disorder. Other views for parental involvement in the development of autism can be found in Bettleheim (1967), Despert (1951), Ferster (1961), Goldfarb (1961), Mandel, Marcus, Roth, and Berenbaum (1971), Tustin (1966), Ward (1970).

Time Period

This is the speculative factor in the EIA formula, and one which is open to some modification in terms of timing and duration. In fact, it may be more appropriate to conceptualize the time period as an "early receptive" period or an "optimal but not truly critical" stage, but such clarifications can only evolve from more understanding of both human and infra-human developmental processes. Presently, a critical/sensitive period concept is used primarily to incorporate the major and very consistent characteristic of the EIA child: the intractability of the primary deficit (the isolation from or general indifference to interpersonal relationships with people). In spite of the range of therapeutic approaches used (Kanner, 1955; 1971), this characteristic has yet to be fully modified, even in three of four of the cases that are said to have recovered (Kanner, 1971). Kanner (1943, 1944, 1956) himself even alludes to this permanency by discussing the "innateness" of the problem. This permanency strongly suggests that such a "people orientation" (human primary social bonds) may actually be rooted in processes occurring during a critical/sensitive period which implies some degree of irreversibility if events do or do not take place. The irremediable nature of the lack of social affiliation shown in Early Infantile Autism is consistent with the long term consequences of inadequate early social experiences in lower organisms.

The actual timing of the suggested critical/sensitive period for primary socialization, if it occurs in humans, is vague. Bowlby (1958, 1969) states that a stable mother-child attachment is formed within the first year of life, while Provence and Lipton (1962) report that during the second half of the first year of life, a number of undesirable behavioral patterns already emerge as a consequence of institutionalization. When discussing social attachment, Stone, Smith, and Murphy (1973) state that during the first four months the child is "hooked on social stimulation (from people) at large [p. 988]." Scott (1968) places "...the end of the period of socialization at the approximate age of seven months... [p. 38]." Both Salk (1962) and Hess (1972) believe the relationship between mother and offspring may even begin to occur auditorily prior to birth. Hess

(1959) suggests that if an imprinting period for filiative behavior exists in humans, it would end around 5-1/2 months of age. Harlow and Harlow (1966) report that during the last half of the first month (equivalent to about 2-1/2 - 4 months in humans; Harlow, 1964) infant rhesus monkeys' basic social relationships are established. More recently, Harlow, Harlow, Schiltz, and Mohr (1971) state that "the sensitive period of socialization for macaque monkeys lies between the first 3 to 6 months, or perhaps 3 to 12 months... [p. 123]." Even Kanner (1943, 1944, 1949) reports that within the first year, the parents of EIA children begin to suspect something is wrong when behaviors based on primary social relationships such as interpersonal play, fear of separation, and language development do not evolve as expected.

As a result, it seems likely that insufficient contact between a child and other humans during the first year of life will lead to an impairment in the child's formation of primary social bonds toward people. In turn, this deficit will cause secondary disruptions in behavioral and psychological development that may or may not be modifiable dependent upon the type of environmental experiences to which the child is exposed.

The EIA Syndrome

Even though the lack of an orientation toward people in EIA children has been emphasized, only general statements and infra-human research parallels have been presented concerning the development of the overall EIA syndrome. Though it is not the primary intention of this paper, it is important at this point to analyze the mechanisms involved in the development of these tendencies and behaviors, mechanisms which are compatible with both Kanner's writings and the current EIA formula.

Such an analysis is difficult and most challenging because of a number of interrelating factors which are likely to vary in magnitude with each EIA child. These factors include: (A) a physiochemical deficit of some type which influences the child's reception and/or processing of stimuli; (B) the lack of a primary social orientation toward people which causes unexpected and "unnatural" reactions to social learning situations; (C) a clear differentiation between primary and secondary characteristics; (D) an interaction between behavioral characteristics so that one characteristic, depending upon its prevalence, can enhance (magnify the deficit) or limit the degree of another; and (E) the realization that Early Infantile Autism is not a static syndrome with fixed behavioral repertoires, but one whose symptomology evolves as maturational changes of the child and changes in parental expectations and attitudes occur.

The author differentiates between characteristics of EIA children that are acquired by associative learning principles and those that are not. The presentation of a two-stage model for EIA symptomology (see Figure 1) implies that secondary characteristics are learned, that they are a consequence of the

presence of one or both primary characteristics, and that they should not be considered part of the core deficiency of Early Infantile Autism.

Simply, the basic problem of the lack of a social orientation toward humans results from insufficient contact experiences with people early in life. More speculatively, the tendency toward strict insistence on sameness can be viewed as developing for at least two reasons: (1) the reduced level of early and varied stimulation contributing to an over-dependence on the familiar and (2) a need for security that is not satisfied by being around people (due to the lack of identification with them), but which is fulfilled by the maintenance of repetitive routines and with familiar objects and settings. In turn, these two primary characteristics are the foundation from which the secondary behavioral characteristics evolve.

Any EIA behaviors in the second stage are acquired just as normal behaviors are learned. Not only does this account for the changes in these behaviors as the child matures and undergoes therapy and/or remedial instruction, but also for the tendency to confuse retarded, psychotic, and autistic-like children (who can acquire very similar characteristics) with the true EIA syndrome discussed in this paper.

Even though an analysis of the acquisition of the secondary behavioral characteristics warrants more attention that this paper can provide, it may be fruitful to attempt an analysis in two cases as a brief demonstration of the current theoretical position.

(1) Excellent rote memories: Over and above some kind of "innate knack" which many normal individuals seem to possess and which the EIA child may also have, an excellent rote memory ability can be vastly improved with encouragement and practice.

Given a child not identifying with humans and one reacting more positively to material/inanimate than to social stimuli, it is likely that parents would tend to interact with this child in a manner that compliments the child's preferences and strengths. Furthermore, parental preferences for such interactions would be complimented by such a preference in the child. With Early Infantile Autism, it appears that such a situation exists. As Kanner (1943) reports:

> Almost all of the parents reported, usually with much pride (author's italics), that the children had learned at an early age to repeat an inordinate number of nursery rhymes, prayers, lists of animals, the roster of presidents, the alphabet forward and back, even foreign language lullabies... Their excellent rote memory, coupled with the inability to use language in any other way, often led the parents to stuff them (author's italics) with more and more verses, zoologic and botanic names, titles and composers of victrola record pieces, and the like... (p. 234).

Even with well-meaning parents, it is likely that memorisation training instilled in the children a tendency to memorize all verbalizations, even those not intended for memorization such as questions and communicative statements from parents; thus, echolalic communication might be encouraged indirectly. Would it be clear to a child lacking an identification with people that it is expected to readily differentiate between "things to memorize" and "things not to memorize?"

Moreover, memorization training may impair future linguistic capabilities. "It is difficult to know for certain whether the memorization as such has contributed essentially to the course of the psychopathologic condition. But it is also difficult to imagine that it did not cut deeply into the development of language as a tool for receiving and imparting meaningful messages [Kanner, 1943, p. 243]."

(2) Echolalia: In the current interpretation, the child merely memorizes what is said and repeats it then or later. Characteristically with the EIA child, affirmation is conveyed by exact repetition and denial by ignoring or non-compliance. Communication in this manner is atypical, yet very effective. One must conclude that the child exhibits this type of communication symptomology because interactions in this manner were previously rewarded. In addition, it seems that the child views its verbalization as a single specific response (not a series of interchangeable component word responses) which is emitted in the presence of a particular stimulus situation or need state. As a result, each response whole has a special meaning. For example, "...the child, once told by his mother, 'Now I will give you your milk', expresses the desire for milk in exactly the same words...If the mother's original remark has been made in the form of a question, it is reproduced with the grammatical form and the inflection of a question. The repetition 'Are you ready for your dessert?' means that the child is ready for his dessert [Kanner, 1943, p. 244]." It is evident that the reinforcement of such echolalic statements with milk or dessert would not only strengthen each response, but also would likely decrease the probability of putting words together into novel statements later on.

If echolalia is learned, one may ask why would well-intending parents permit or encourage this type of communication? Three possible explanations include: (1) these verbalizations are viewed as being better than none and "more normal" than being mute; (2) for a parent with its own interests and activities, this communication is efficient, sufficient, and actually more convenient than waiting for a more appropriate response; and (3) it may be assumed by the parents that eventually and quite "naturally", the child would begin to use phrases and sentences more appropriately after a period of echolalia. These explanations are understandable, but with an EIA child they may be detrimental, especially the last. Given a normal child who does identify with humans, who regularly imitates and tries to please them, and who attends to social reinforcing cues that others provide, the evolution of normal language is no doubt very natural. But for a child without such an orientation and one experiencing physical or

other behavioral deficiencies, it may be very difficult for appropriate language usage to occur without specific training and considerable effort.

Though brief, the preceding analyses will help to demonstrate that these and other secondary characteristics not evaluated can be, and most likely are, acquired through conditioning. Even though the parents of EIA children did contribute to the development of the primary characteristics with insufficient contact experiences early in life, they must still be viewed as desiring positive behaviors and experiences from and for their child as it matures; thus, they are not viewed as intentionally teaching atypical behaviors. Unfortunately and unexpectedly to parents, the child who is later diagnosed as an EIA child does not readily discard any atypical characteristics in favor of more socially oriented and desired behaviors. In fact, one can correctly inquire as to why this child really should strive to behave like people if it does not possess a "people orientation." At most, the EIA child acquires behaviors designed to interact with people in order to satisfy the child's needs/wants, but such a child does not exhibit behaviors that signify a relationship to people.

Summary and Conclusion

A formula for the development of Early Infantile Autism, as defined by Leo Kanner, has been provided. This formula, emphasizing the necessary interaction of three components, incorporates: (A) the behavior of the child; (B) the behavior of the parent; and (C) a particular time period of development. What results is an insufficient degree of contact experiences with people within the first year so that a child develops who is without a primary social orientation toward people. In turn, this major and all pervasive deficit of the EIA child then serves to facilitate the development of other characteristic behaviors which are acquired by means of regular associative learning. The use of a critical/sensitive period in the EIA formula implies that the primary deficit may be resistant to modification compared to the many secondary characteristics of this disorder.

The reader is reminded that the use of a "formula" emphasizes the interaction between components. As a result, it is futile to explain an EIA child's behavior only as a function of parental activities or to even doubt the psychogenic component itself by countering with the fact that EIA-type parents do not always raise EIA children. It is just as futile to question the biogenic component by stating that not all brain-damaged children become EIA children or that no known part of the brain can lead to EIA symptomology. When evaluating this formula, the reader must not ignore any other component. Furthermore, one must not be mislead into thinking of a particular parent-child style of interaction at two or five years of age and relating these experiences to the formula. The important parent-child interaction (or actually a lack of it) which negates the formation of a "people orientation" is within the first year. A particular style of interaction after the first year must be viewed as only contributing to the development of secondary behavioral characteristics.

The writer believes that the current formula is compatible with all descriptions of the EIA syndrome that have been offered by Leo Kanner since 1943. No intention was made to explain the development of behaviors in children with similar behavioral symptoms; e.g. "childhood autism", "autistic", "autistic-like", etc.

Finally, the formula is not inconsistent with theories of autism which have stressed either a biogenic or psychogenic rationale. In fact, the current theoretical framework is such that these theories can be easily incorporated into it with little adjustment on their part. Because of this, it is hoped that the current formula and discussion will provide a more meaningful understanding of how both physical and psychological parameters effect the EIA child as it develops and that such an analysis will aid in understanding normal development, especially the role that a "people orientation" has in it.

FOOTNOTES

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[2] Requests for reprints: M. Aaron Roy, Department of Psychology, Ashland College, Ashland, Ohio 44805 (page 1).

[3] Individuals who have used the concept of critical periods when discussing human behavior include Gray, 1958; Bronson, 1962; Scott, 1963; Bayley, 1968; Taketomo, 1968; Lenneberg, 1969; Elkind, 1971; Connolly, 1972; and Yarrow and Goodwin, 1973. Additionally, the role of early experiences has been viewed as an important precursor in cognitive development (Berlyne, 1960, and Hunt, 1961), language development (Lenneberg, 1969, and Eveloff, 1971), and personality development (Sears, Maccoby, and Levin, 1957, and Yarrow, 1968) (page 9).

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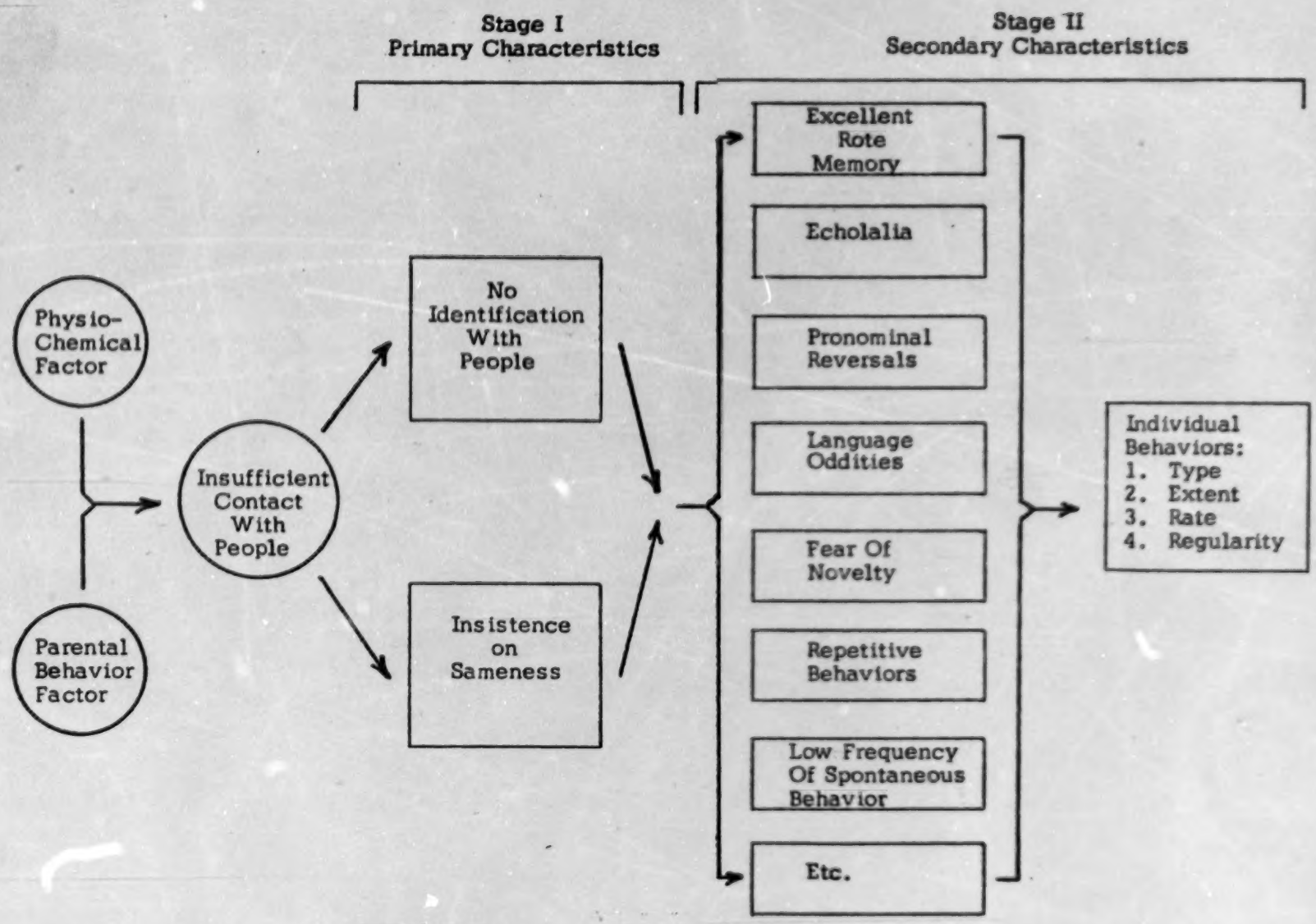

Figure 1. Primary and secondary characteristics in the development of Early Infantile Autism.